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WASTE MANAGEMENT

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Why GAO Did This Study

Burn pits help base commanders manage waste generated by U.S. forces overseas, but they also produce harmful emissions that military and other health professionals believe may result in chronic health effects for those exposed. Section 313 of the NDAA for FY 2015 requires the Secretary of Defense to review DOD compliance with law and guidance regarding the disposal of covered waste in burn pits. DOD submitted a report on the results of its review in March 2016.

Section 313 also includes a provision for GAO to assess DOD's report and its compliance with applicable DOD instruction and law. This report evaluates the extent to which (1) DOD's report addressed the elements required in section 313; (2) DOD, including combatant commands, issued guidance for burn pit use that addresses applicable legislative requirements; and (3) DOD has assessed any health risks of burn pit use. GAO compared DOD's report to elements required in section 313, reviewed policies and procedures and interviewed DOD officials.

What GAO Recommends

GAO made three recommendations to include establishing policies and procedures and ensuring research specifically examines the relationship between direct burn pit exposure and long-term health issues. DOD concurred with the first recommendation and partially concurred with the second, citing research it has or has plans to conduct. GAO agrees this research contributes to general understanding but continues to believe more specific research is needed.

View [GAO-16-781](#). For more information, contact Cary Russell at (202) 512-5431 or RussellC@gao.gov.

What GAO Found

In assessing the Department of Defense's (DOD) March 2016 report to Congress on the use of burn pits, GAO found that it generally addressed the requirements in section 313 of the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2015. To complete this report, DOD tasked the military services, the Joint Staff, and the overseas combatant commands to provide information on the requirements in the mandate, including policies and procedures related to the disposal of covered waste (including certain types of hazardous waste, medical waste, and items such as tires, treated wood, and batteries) in burn pits during contingency operations. GAO found that DOD's report fully addressed four of the seven reporting requirements and partially addressed the remaining three. For example, the report addressed who is responsible for ensuring compliance with the legislative requirements, but partially addressed whether the waste categories are appropriately and clearly distinguished in surveys and assessments.

Although DOD established guidance to meet applicable legislative requirements through the issuance of DOD Instruction 4715.19, U.S. Central Command is the only overseas geographic combatant command that has established complementary policies and procedures for implementing this guidance. The instruction applies to all the combatant commands, but it does not specify how combatant commanders will ensure compliance with requirements in the instruction. Officials from the other geographic combatant commands stated that their commands have not developed similar policies and procedures because they do not utilize burn pits and there is an absence of current contingency operations in their respective areas of responsibility. Nonetheless, while most of the overseas geographic commands may not currently be involved in contingency operations within their areas of responsibility, waste disposal would likely be required if such operations arise in the future, and the use of burn pits would be one option for disposing of waste. Establishing policies and procedures would better position these commands to implement DOD's instruction.

The effects of exposing individuals to burn pit emissions are not well understood, and DOD has not fully assessed these health risks. DOD officials stated that there are short-term effects from being exposed to toxins from the burning of waste. However, the officials also stated that DOD does not have enough data to confirm whether direct exposure to burn pits causes long-term health issues. Although DOD and the Department of Veterans Affairs have commissioned studies to enhance their understanding of burn pit emissions, the current lack of data on emissions specific to burn pits and related individual exposures limits efforts to characterize potential long-term health impacts on servicemembers and other base personnel. A 2011 report by the Institute of Medicine outlined the data needed for assessing exposures and potential related health risks, and the Department of Veterans Affairs has established a registry to collect some information. However, DOD has not undertaken data-gathering and research efforts to specifically examine this relationship to fully understand any associated health risks.

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Abbreviations

DOD	Department of Defense
CENTCOM	United States Central Command
NDAA	National Defense Authorization Act

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September 26, 2016

Congressional Committees

Since the initiation of military operations in Afghanistan in 2001 and Iraq in 2003, the Department of Defense (DOD) has employed several methods to dispose of the waste that U.S. forces have generated in both countries. In general, the methods employed have been left to the discretion of base commanders and include the use of incinerators, landfills, and open-air burn pits on or near military bases. According to DOD officials, when making these decisions, base commanders may take into consideration a number of factors, including the local security situation, the number of personnel on the installation, and the amount and type of waste generated by those personnel. As one of the options available, burn pits help base commanders manage waste, but they also produce smoke and harmful emissions that military and other health professionals believe may result in acute and chronic health effects for those exposed to the emissions. U.S. environmental laws, such as the Clean Air Act and the Solid Waste Disposal Act, do not generally apply overseas.

Section 317 of the National Defense Authorization Act for Fiscal Year 2010 (NDAA for Fiscal Year 2010) requires that DOD develop regulations prohibiting the disposal of covered waste (including certain types of hazardous waste, medical waste, and items such as tires, treated wood, and batteries) in open-air burn pits during contingency operations, except in circumstances where DOD determines that alternatives are not feasible.¹ In such a circumstance, the department is to submit notification of this determination to the House and Senate Armed Services Committees and include the circumstances, reasoning, and methodology that led to such a determination.² Since enactment of the NDAA for Fiscal Year 2010, the department has submitted two notifications to the House and Senate Armed Services Committees.

¹ Pub. L. No. 111-84, § 317(a)(1), (c)(2) (2009).

² After DOD submits this notice, for each subsequent 180-day period during which covered waste is disposed of in the open-air burn pit covered by such notice, DOD must also submit to the House and Senate Armed Services Committees the justification for continuing to operate such open-air burn pit. Pub. L. No. 111-84, § 317(a)(2)(B) (2009).

Section 313 of the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015 (NDAA for Fiscal Year 2015) requires the Secretary of Defense to conduct a review of the compliance of the military departments and combatant commands with Department of Defense Instruction 4715.19 as well as with the provisions of section 317 of the NDAA for Fiscal Year 2010 regarding the disposal of covered waste in open-air burn pits.³ In addition, section 313 of the NDAA for Fiscal Year 2015 requires that, not later than 1 year after its enactment, the department is to submit a report to the congressional defense committees containing the results of its review. DOD submitted that report in March 2016.⁴ Section 313 also includes a provision for GAO to assess the methodology used by DOD in conducting its review, the adequacy of DOD’s report, and DOD’s compliance with DOD instruction 4715.19 and applicable law regarding the disposal of covered waste in open-air burn pits by the military departments and combatant commands. This report evaluates the extent to which (1) DOD’s March 2016 report addresses the elements required in section 313 of the NDAA for Fiscal Year 2015; (2) DOD, to include the combatant commands, issued guidance for burn pit use that addresses applicable legislative requirements; and (3) DOD has assessed any health risks of burn pit use.

To evaluate the extent to which DOD’s March 2016 report addresses the elements required in section 313 of NDAA for Fiscal Year 2015, we reviewed the methodology DOD used to create the report and analyzed the content of DOD’s report to determine the extent to which it addresses each of seven elements required in section 313. We also interviewed knowledgeable officials about compiling information for the report and the methodology used to develop the report, including individuals within the Office of the Secretary of Defense; overseas geographic Combatant Commands, including U.S. Central Command (CENTCOM), U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command; service component commands, including U.S. Army Central Command and U.S. Air Force Central Command; and the Joint Staff. Two GAO analysts independently reviewed DOD’s report and compared its contents with each element required by section 313. The

³ Pub. L. No. 113-291 § 313(a) (2014).

⁴ Department of Defense, *Report on Prohibition of the Disposal of Covered Waste in Open-Air Burn Pits* (March 2016).

analysts categorized each of the reporting requirements as one of the following: (1) “addressed,” if our assessment showed that the information reported by DOD fully addresses the element required by section 313 of the NDAA for Fiscal Year 2015; (2) “partially addressed,” if our assessment showed that additional information is needed to fully address the reporting requirement; or (3) “not addressed,” if our assessment showed that DOD did not report any information related to the reporting requirement. The two analysts created a final assessment that reconciles their two independent assessments and reflects the analysts’ consensus. In the case of any conflicting determinations, a GAO staff attorney adjudicated the difference.

To determine the extent to which DOD, to include combatant commands, issued guidance for burn pit use that addresses applicable statutory requirements,⁵ we gathered and assessed information regarding DOD’s policies on the disposal of waste, including DOD Instruction 4715.19 and DOD Instruction 4715.22. In addition, we identified any policies and procedures that the overseas combatant commands have in place to implement DOD guidance. We discussed the implementation of CENTCOM’s policies and procedures with officials from CENTCOM and U.S. Army Central Command. We also contacted U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command to obtain information on their use of burn pits and relevant guidance they have developed. We did not contact U.S. Northern Command because it was not in the scope of DOD’s report. We then evaluated the policies, procedures, and actions identified against relevant DOD guidance and applicable law, including section 313 of the NDAA for Fiscal Year 2015 and section 317 of the NDAA for Fiscal Year 2010. We were not able to verify the extent to which burn pits are used, but instead relied on the information officials provided.

To evaluate the extent to which DOD has assessed any health effects of burn pit use, we reviewed relevant health assessments on the effects of burn pits, including a 2011 report by the Institute of Medicine that was contracted by the Department of Veterans Affairs, as well as prior related reports by GAO and the Special Inspector General for Afghanistan

⁵ These statutory requirements are established in the NDAA for Fiscal Year 2010, Pub. L. No. 111–84, § 317 (2009).

Reconstruction. We also interviewed officials from U.S. Central Command, U.S. Army Central Command, U.S. Air Force Central Command, Department of Veterans Affairs, and Institute of Medicine to discuss any effects of exposures to burn pit emissions, among other things.

We conducted this performance audit from July 2015 to September 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

DOD Burn Pit Use

In establishing related guidance on solid waste management in 1978, DOD has recognized that burning waste in open pits poses environmental and health hazards.⁶ However, burn pits—shallow excavations or surface features with berms used to conduct open-air burning—were often chosen as a method of waste disposal during recent contingency operations in the CENTCOM area of responsibility, which extends from the Middle East to Central Asia and includes Iraq and Afghanistan.

In 2010 we reported that there were 251 active burn pits in Afghanistan and 22 in Iraq.⁷ Additionally, we reported that the military used burn pits to dispose of waste because of their expedience, and that waste management alternatives could decrease DOD's reliance on the use of burn pits. We recommended that DOD implement relevant guidance related to burn pit operations, improve its adherence to relevant guidance on waste management, and analyze alternatives to its current practices. DOD generally concurred with the recommendations and took actions to address them. For example, the Army Materiel Command began focusing

⁶ Departments of the Army, Navy, and Air Force, Army PAM 420-47 NAVFAC MO-213 AFP 91-8, *Solid Waste Management* (June 1978).

⁷ GAO, *Afghanistan and Iraq: DOD Should Improve Adherence to Its Guidance on Open Pit Burning and Solid Waste Management*, GAO-11-63 (Washington, D.C.: Oct. 15, 2010).

on solid waste management, including burn pits, and required contractors to segregate non-hazardous, hazardous, and recyclable materials; establish recycling systems; and maintain all solid waste operations in accordance with DOD guidance.

According to DOD officials, while the Army considered alternative waste disposal methods such as deployable, ready-made incinerators as standard equipment to each Army unit, it ultimately decided against issuing them due to logistical issues. Further, the use of waste disposal alternatives other than burn pits is not always possible. For example, DOD officials have stated that there have been times when incinerators have not been used because of the challenges associated with obtaining permits and visas for the personnel who were contracted to operate and maintain them. In addition, DOD officials stated that using landfills as an alternative waste disposal option has not always been an option because of security concerns surrounding local landfills off base or space constraints for landfills on base. When alternatives are not available, military base commanders have resorted to the use of burn pits.

Health Concerns Related to the Use of Burn Pits

Although burn pits help base commanders to manage waste, they also produce smoke and harmful emissions that military and other health professionals believe may result in acute and chronic health effects for those exposed. We previously reported that some veterans returning from the Iraq and Afghanistan conflicts have reported pulmonary and respiratory ailments, among other health concerns, that they attribute to burn pit emissions.⁸ Numerous veterans have also filed lawsuits against a DOD contractor alleging that the contractor mismanaged burn pit operations at several installations in both Iraq and Afghanistan, resulting in exposure to harmful smoke that caused these adverse health effects. We also previously reported on the difficulty of establishing a correlation between occupational and environmental exposures and health issues.⁹ For example, in 2012 we found that establishing causation between an exposure and an adverse health condition can be difficult for several reasons, including that for many environmental exposures, there is a

⁸ GAO-11-63.

⁹ GAO, *Defense Health Care: DOD Needs to Clarify Policies Related to Occupational and Environmental Health Surveillance and Monitor Risk Mitigation Activities*, GAO-15-487 (Washington, D.C.: May 22, 2015).

latency period—the time period between initial exposure to a contaminant and the date on which an adverse health condition is diagnosed.¹⁰ When there is a long latency period between an environmental exposure and an adverse health condition, choosing between multiple causes of exposure may be difficult. In addition, in 2015 we found that the Army had recently published a study that evaluated associations between deployment to Iraq and Kuwait and the development of respiratory conditions post-deployment.¹¹ However, the study was unable to identify a causal link between exposures to burn pits and respiratory conditions.

Relevant Laws, DOD Guidance, and CENTCOM Regulations

Section 317 of the NDAA for Fiscal Year 2010 requires DOD to develop regulations prohibiting the disposal of covered waste in burn pits during contingency operations, except in circumstances where alternatives are not feasible.¹² This provision also requires DOD to notify Congress of the decision to dispose of covered waste in burn pits, along with the circumstances, reasoning, and methodology leading to the decision. Additionally, for each subsequent 180-day period during which covered waste is disposed of in a burn pit, DOD must submit to Congress a justification for continuing to operate the burn pit. Further, even in the absence of a contingency operation and applicable guidance, DOD overseas environmental guidance exists prohibiting the use of burn pits, except in certain instances.¹³

In response to section 317, DOD issued department-wide guidance regarding the use of burn pits, environmental management, and occupational health. Specifically, in 2011 the Under Secretary of Defense for Acquisition, Technology and Logistics issued DOD Instruction 4715.19, which establishes policy, assigns responsibilities, and provides

¹⁰ GAO, *Defense Infrastructure: DOD Can Improve Its Response to Environmental Exposures on Military Installations*, GAO -12-412 (Washington, D.C.: May 1, 2012).

¹¹ GAO, *Defense Health Care: DOD Needs to Clarify Policies Related to Occupational and Environmental Health Surveillance and Monitor Risk Mitigation Activities*, GAO-15-487 (Washington, D.C.: May 22, 2015), and Abraham et al., “A Retrospective Cohort Study of Military Deployment and Postdeployment Medical Encounters for Respiratory Conditions,” *Military Medicine*, vol. 179 (2014): 540-546.

¹² Pub. L. No. 111-84, § 317 (2009).

¹³ DOD 4715.05G, *Overseas Environmental Baseline Guidance Document* (May 1, 2007).

guidance regarding the use of burn pits during contingency operations.¹⁴ In 2016 DOD issued Instruction 4715.22, which establishes policy, assigns responsibilities, and provides direction for environmental management at contingency locations.¹⁵ Additionally, the guidance directs the Assistant Secretary of Defense for Energy, Installations, and Environment to establish Contingency Location Environmental Standards by February 2017. These standards are to define environmental standards for implementation at contingency locations in order to protect force health, minimize environmental impact, and sustain mission effectiveness.

Two other DOD instructions, DOD Instruction 6055.05 and DOD Instruction 6055.01, provide guidance regarding risk management procedures associated with occupational or environmental factors.¹⁶ Specifically, DOD Instruction 6055.05 expands risk management procedures to anticipate, recognize, evaluate, and control health hazards associated with occupational and environmental exposures to chemical, physical, and biological hazards in DOD workplaces, including military operations and deployments. The guidance is aimed at protecting DOD personnel from accidental death, injury, and illness caused by hazardous occupational or environmental exposures. Further, it applies risk management strategies designed to achieve reductions in all mishaps, injuries, and illnesses, and compliance with DOD safety and health standards and policies. DOD Instruction 6055.01 provides guidance to protect DOD personnel from accidental death, injury, or occupational illness throughout all operations worldwide, with certain limitations. Specifically, this guidance reinforces the concept of applying risk management strategies to eliminate occupational injury or illness and loss of mission capability and resources, both on and off duty.

¹⁴ DOD Instruction 4715.19, *Use of Open-Air Burn Pits in Contingency Operations* (Feb. 15, 2011) (incorporating change 3, July 3, 2014).

¹⁵ DOD Instruction 4715.22, *Environmental Management Policy for Contingency Locations* (Feb. 18, 2016).

¹⁶ DOD Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program* (Oct. 14, 2014); DOD Instruction 6055.05, *Occupational and Environmental Health (OEH)* (Nov. 11, 2008).

Since 2008, CENTCOM has issued guidance relating to environmental assets within its area of responsibility. CENTCOM Regulation 200-1 requires bases within CENTCOM's area of responsibility to have an environmental assessment program, structured to optimize environmental asset expertise, protection, enhancement, and security.¹⁷ This regulation requires CENTCOM environmental leads to develop policies and procedures for management and disposal of solid waste, hazardous waste, and medical waste, among others. CENTCOM Regulation 200-2 guides solid waste management practices throughout CENTCOM's area of responsibility, including minimum requirements for operating and monitoring burn pits.¹⁸ This regulation also provides guidance for managing environmental concerns, such as hazardous materials and regulated medical and solid waste. It also includes requirements for base commanders to develop a solid waste management plan and strategy to transition to alternative waste disposal methods, such as an incinerator.

DOD's Report on the Disposal of Covered Waste in Burn Pits Generally Addressed Mandate Requirements

On the basis of our assessment of DOD's March 2016 burn pit report, we found that it generally addressed the requirements in section 313 of the NDAA for Fiscal Year 2015. According to DOD officials, to gather information for and develop its report, DOD tasked each of the military services, the Joint Staff, and the overseas combatant commands—U.S. Central Command, U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command—to provide information on the requirements in section 313, which included providing information on the policies and procedures related to the disposal of covered waste in burn pits during contingency operations. Section 313 contains seven specific reporting elements that DOD was required to address in its report. We determined, based on our assessment, that DOD's report fully addressed four of the seven reporting requirements and partially addressed the remaining three. Table 1 summarizes our analysis of the extent to which DOD's report addressed each of the specific requirements in section 313.

¹⁷ Central Command Regulation 200-1, *Protection and Enhancement of Environmental Assets* (Oct. 2, 2015).

¹⁸ Central Command Regulation 200-2, *CENTCOM Contingency Environmental Standards* (Sept. 15, 2014).

Table 1: Assessment of the Department of Defense’s (DOD) March 2016 Burn Pit Report in Response to Requirements in Section 313 of the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015

Section 313 Reporting Requirement	GAO Assessment ^a	Comments
1. The reporting of covered waste through environmental surveys and assessments, including environmental condition reports, of base camps supporting a contingency operation.	Partially addressed	DOD described guidance related to reporting covered waste, including DOD Instruction 4715.19, Central Command Regulation 200-1, and Central Command Regulation 200-2, but did not discuss whether there was any actual reporting of covered waste through environmental surveys and assessments.
2. How covered waste and non-covered waste is defined and identified in environmental surveys and assessments covered by paragraph (1), in policies, instructions, and guidance issued by the Department of Defense, the military departments, and the combatant commands, and in the oversight of contracts for, and the operation of, waste disposal facilities at base camps supporting contingency operations.	Addressed	DOD identified how covered waste is defined in DOD instruction 4715.19. DOD explained that while no guidance defines non-covered waste ^b Central Command Regulation 200-2 defines burnable solid waste. DOD reported that the definitions apply to the operation of waste disposal facilities, including those under contract.
3. Whether the two categories of waste are appropriately and clearly distinguished in such surveys and assessments.	Partially addressed	DOD reported on related guidance used to distinguish the two categories of waste as outlined in DOD Instruction 4715.19, Central Command Regulation 200-1, and Central Command Regulation 200-2. However, DOD did not report on whether the two categories of waste are appropriately and clearly distinguished in the surveys and assessments ^c .
4. The current decision authority responsible for determinations regarding whether a base camp supporting a contingency operation is in compliance with the Department of Defense Instruction and Section 317 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111–84; 123 Stat. 2249; 10 U.S.C. 2701 note) and the chain of command by which such determinations are made and reported.	Addressed	DOD reported that the combatant commander for a given area of responsibility is responsible for ensuring compliance with section 317 of the National Defense Authorization Act for Fiscal Year 2010, and describes the chain of command by which determinations that alternatives to the use of burn pits to dispose of covered waste are not feasible.

5. The process through which a waiver ^d of the prohibition on disposal of covered waste in a burn pit is requested and approved, and the process by which Congress is notified of such waiver, pursuant to the applicable provision of law, and how such processes could be improved.	Partially addressed	DOD reported on the notification process by which burning covered waste in a burn pit is requested and approved, and the process by which Congress is notified; including that combatant commanders are responsible for making the final determination that no alternative method for the disposal of covered waste is feasible. However, DOD did not discuss how this notification process could be improved.
6. Updates to policies, guidelines, and instructions that have been undertaken pursuant to the review to address gaps and deficiencies regarding covered waste disposal to ensure compliance.	Addressed	DOD reported DOD Instruction 4715.22 as recently published DOD guidance, developed to provide direction for environmental management at contingency locations. ^e
7. Other matters or recommendations the Secretary of Defense determines are appropriate.	Addressed	DOD reported that there are no additional matters or recommendations to discuss.

Source: GAO analysis of DOD information | GAO-16-781

^aWe categorized each of the reporting requirements as one of the following: (1) "addressed" if our assessment showed that the information reported by DOD fully addresses the element required by section 313 of the NDAA for Fiscal Year 2015, (2) "partially addressed" if our assessment showed that additional information is needed to fully address the reporting requirement, and (3) "not addressed" if our assessment showed that DOD did not report any information related to the reporting requirement.

^b"Non-covered waste" is not specifically defined in DOD Instruction 4715.19. However, Central Command Regulation 200-2 defines the term "Burnable Solid Waste" as non-hazardous waste from a dining facility, logistical support areas, motor pool, and/or other non-hazardous waste source on a base camp that can be safely burned to reduce its volume.

^cThough DOD reported on guidance used to distinguish between covered and non-covered waste, DOD officials stated that other than in the notification of open-air burning submitted to Congress, current guidance does not require any such distinction in environmental surveys and assessments.

^dSection 317 of the National Defense Authorization Act of 2010 requires that DOD submit a notification to Congress when DOD determines that no alternative disposal method is feasible. Instead of DOD seeking a waiver from Congress, section 317 grants the authority to DOD to decide whether the exception to the prohibition on open-air burn pits applies.

^eDOD Instruction 4715.22 directs the Assistant Secretary of Defense for Energy, Installations, and Environment to establish Contingency Location Environmental Standards by February 2017. As per DODI 4715.22, these standards are to include minimum environmental compliance standards and best management practices, including those that avoid or mitigate adverse effects to recognize cultural, historic, and natural resources to the maximum extent practicable, given mission requirements.

Our assessment identified that reporting requirements 1, 3, and 5 are partially addressed in DOD's report because we found that the responses to the reporting requirement lacked required detail and instead only identified relevant policy. For example, we assessed reporting requirement 3 to be partially addressed because DOD's report included guidance used to distinguish categories of waste but did not include

information about whether the categories were appropriately and clearly distinguished in environmental surveys and assessments. Similarly, we assessed reporting requirement 5 to be partially addressed because DOD reported on the notification process by which burning covered waste in a burn pit is requested and approved, and the process by which Congress is notified, but did not discuss how this notification process could be improved, if applicable.

The DOD official responsible for compiling the report stated that because section 313 of the National Defense Authorization Act of Fiscal Year 2015 applies to the Office of the Secretary of Defense, which focuses primarily on strategic and policy-related issues, the requests for specific information contained in reporting requirements 1, 3 and 5 were outside its purview, and information with this degree of specificity could be provided only by lower-level commands. The Office of the Secretary of Defense tasked lower-level commands, including each of the military services, the Joint Staff, and the combatant commands, to provide information for the report. However, the tasking order sent to these lower-level commands contained the same wording as the mandate language in section 313 of the National Defense Authorization Act of Fiscal Year 2015, with little clarification of the level of detail that these entities should include in their responses. As a result, the level of information obtained and used to develop the report varied and partially addressed three of the seven requirements.

DOD Established Guidance to Meet Applicable Law, but Most Combatant Commands Have Not Issued Policies and Procedures for Implementing DOD Guidance on Burn Pit Use

While DOD issued guidance on burn pit use, as required by law, it is not clear how the guidance will be implemented in future contingency operations because the overseas combatant commands, except for CENTCOM, have not issued related policies and procedures for implementing this guidance. As previously stated, in response to section 317 of the National Defense Authorization Act of Fiscal Year 2010, in 2011 DOD issued DOD Instruction 4715.19. This instruction defines covered waste as hazardous waste, medical waste, and other items including tires, treated wood, batteries, and plastics, among other things.¹⁹ The guidance also prohibits the disposal of covered waste in burn pits during contingency operations, except in circumstances where alternatives are not feasible, and provides high-level guidance on the notification process in such circumstances. Specifically, the instruction states that the Under Secretary of Defense for Acquisition, Technology, and Logistics must notify Congress within 30 days of the combatant commander's determination that no alternative disposal method for covered waste, other than in a burn pit, is feasible. The instruction further states that a justification for continued burning of covered waste in a burn pit is also required to be submitted to Congress for each subsequent 180-day period.

CENTCOM is the only overseas geographic combatant command that has established policies and procedures that govern waste management during contingency operations, including implementing the DOD burn pit guidance. Specifically, CENTCOM Regulations 200-1 and 200-2 provide policies, assign responsibilities for implementing DOD Instruction 4715.19, and set environmental standards. CENTCOM Regulation 200-2 applies to military personnel and civilian contractors who operate burn pits in the CENTCOM area of responsibility, and CENTCOM Regulation 200-1 applies to its components and to all other U.S. military forces operating in CENTCOM's area of responsibility. These regulations provide, among other things, detailed guidance for submitting burn pit notifications. Additionally, CENTCOM Regulation 200-2 acknowledges that burn pits are typically used when bases are first established, but provides a specific threshold—when an installation exceeds 100 U.S.

¹⁹“Non-covered waste” is not defined in DOD Instruction 4715.19. However, CENTCOM Regulation 200-2 defines the term “burnable solid waste” as non-hazardous waste from a dining facility, logistical support areas, motor pool, and/or other non-hazardous waste source on a base camp that can be safely burned to reduce its volume.

personnel for 90 days—after which burn pits must be replaced by alternative waste disposal methods. If, however, there is no feasible alternative to the use of burn pits, base officials are to forward the rationale for the continued use of burn pits to the appropriate service component command.

According to DOD officials familiar with CENTCOM's procedures, this determination is first sent to the appropriate land component or joint task force command for review. These commands work in conjunction with the base commander to ensure that the burn pit justification criteria are met.²⁰ The notification is then sent to the designated service component, and the service component decides whether the notification will be further processed. In doing so, the service component reviews the rationale, such as the basis for the lack of alternatives, an estimate of how long burn pits will continue to be used, or a preliminary health assessment, and then forwards the notification to CENTCOM along with a recommendation for approval or disapproval. Once approved by CENTCOM, according to officials, the determination is forwarded to the Under Secretary of Defense for Acquisition, Technology, and Logistics within 15 days after approval.

The use of burn pits in the CENTCOM area of responsibility has declined since our last report in 2010. As of June 2016, DOD officials told us that there were no military-operated burn pits in Afghanistan and only one in Iraq, of which Congress had been notified.²¹ According to DOD officials, the decline in the number of burn pits from 2010 to 2016 can be attributed to such factors as (1) using contractors for waste disposal and (2) increased use of waste management alternatives such as landfills and incinerators. DOD officials also acknowledged, however, that burn pits are being used to dispose of waste in other locations that are not military-

²⁰ According to DOD's March 2016 report, determination requests must describe the specific standard for which a determination is being requested, the reason or basis for the determination request, and the duration of the requested determination; provide a justification for the request; and include a preliminary health assessment.

²¹ The location is Al Taqaddum Air Base, Iraq, where officials told us that although incinerators were procured for use, the determination to use burn pits was made because contractor personnel who were to operate and maintain the incinerators could not obtain the necessary work visas. In addition, officials told us that difficulties associated with procuring the necessary building permits to install and operate the incinerators forced the base commander to rely on burn pits to dispose of waste.

operated and that no notifications have been made in these instances because the means of disposal are not within DOD's control. Specifically, these officials noted instances in which local contractors had been contracted to haul away waste and subsequently disposed of the waste in a burn pit located in close proximity to the installation. In such instances, officials stated that they requested that the contractors relocate the burn pit.

In contrast with CENTCOM, other geographic combatant commands have not established additional policies and procedures that govern waste management, including the disposal of waste in burn pits and the notification procedures to be followed in the event that no other alternatives are feasible. As of June 2016, according to an official from U.S. Africa Command, command-specific burn pit policies and procedures were being developed. According to officials from the other overseas geographic combatant commands, their commands have not developed similar policies and procedures because they do not utilize burn pits and there is an absence of current contingency operations in their respective areas of responsibility. In addition, a U.S. European Command official explained that their operations are generally in countries that have specific guidance that discourage the use of burn pits as a method of waste disposal.²² Nonetheless, while most of the overseas geographic commands may not currently be involved in contingency operations within their areas of responsibility, waste disposal would likely be required if such operations arise in the future, and the use of burn pits would be one option for disposing of waste. Moreover, a U.S. Africa Command official stated that while there were no known DOD-operated burn pits in that command's area of responsibility, burn pits were being operated by local nationals near an installation on which there were DOD personnel.

²² According to a U.S. European Command official, European Union Waste Framework Directive (2008/98/EC) establishes a waste hierarchy and major principles, including the "polluter pays principle," and also requires permits for carrying out waste treatment. The directive states that waste management must be carried out without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odors, and without adversely affecting the countryside or places of special interest. Directive 2008/98/EC, of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing Certain Directives, 2008 O.J. (L 312) 3.

Moreover, DOD's guidance on burn pits in DOD Instruction 4715.19 applies to all the combatant commands, including the requirements to make determinations in circumstances in which no alternative disposal method for covered waste, other than in an open-air burn pit, is feasible, and to forward those determinations to the Under Secretary of Defense for Acquisition, Technology and Logistics. However, the instruction does not specify how combatant commanders will ensure compliance with requirements in the instruction, including which organizations within the commands would be responsible for notifications, or how they would monitor and report on the use of any burn pits. In addition, other than requiring a solid waste management plan that addresses the use of burn pits, the instruction does not require combatant commanders to develop complementary policies and procedures concerning burn pits relevant to their respective areas of responsibility. Further, according to Joint Publication 3-0, *Joint Operations*, waste disposal is a consideration throughout planning and execution, and until forces redeploy.²³ Moreover, according to *Standards for Internal Control in the Federal Government*, those in key roles may further define policies through day-to-day procedures, and these procedures may include the timing of when a control activity occurs and any follow-up corrective actions to be performed by competent personnel if deficiencies are identified.²⁴

DOD officials acknowledged that limiting burn pit use for waste disposal is important, as the relevant guidance stipulates, especially when disposing of covered waste, because of the harmful toxins emitted in the air. Without policies and procedures governing waste management during contingency operations, including the use of burn pits, combatant commanders are not well positioned to implement the requirements of DOD Instruction 4715.19 if burn pits become necessary for disposing of waste in a future contingency operation within their area of operation, specifically with regard to notification procedures that are relevant to the conditions that exist in their respective areas of responsibility.

²³ Joint Chiefs of Staff, Joint Pub. 3-0, *Joint Operations*, (Aug. 11, 2011).

²⁴ GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 2014).

DOD has not Fully Assessed the Health Risks of Burn Pits

The impacts from exposing individuals to burn pit emissions are not well understood, and DOD has not fully assessed these health risks. Under DOD Instruction 6055.01, it is DOD policy to apply risk-management strategies to eliminate occupational injury or illness and loss of mission capability or resources. DOD Instruction 6055.01 also instructs all DOD components to establish procedures to ensure that risk-acceptance decisions are documented, archived, and reevaluated on a recurring basis.²⁵ Furthermore, DOD Instruction 6055.05 requires that hazards are identified and risk is evaluated as early as possible, including the consideration of exposure patterns, duration, and rates.²⁶ Notwithstanding this guidance, according to DOD officials, DOD has not fully assessed the health risks of use of burn pits.

According to DOD officials, DOD's ability to assess these risks is limited by a lack of adequate information on (1) the levels of exposure to burn pit emissions and (2) the health impacts these exposures have on individuals. With respect to information on exposure levels, DOD has not collected data from emissions or monitored exposures from burn pits as required by its own guidance. DOD Instruction 4715.19 requires that plans for the use of open-air burn pits include ensuring the area is monitored by qualified force health protection personnel for unacceptable exposures, and CENTCOM Regulation 200-2 requires steps to be taken to sample or monitor burn pit emissions. A DOD official stated that the department considers open air burning and other airborne contaminant sources when determining its monitoring strategies for the potentially exposed population and evaluating health risks in accordance with DOD Instructions 6490.03 and 6055.05.²⁷ However, the official also stated that DOD has not collected direct data from burn pit emissions because the data do not represent the overall air quality to which personnel are exposed. Additionally, CENTCOM Regulation 200-1 requires environmental surveying to be conducted at a base if the base is occupied or is expected to be occupied for 30 or more days, or at the

²⁵ DOD Instruction 6055.01, *Safety and Occupational Health (SOH) Program* (Oct. 14, 2014).

²⁶ DOD Instruction 6055.05, *Occupational and Environmental Health (OEH)* (Nov. 11, 2008).

²⁷ DOD Instruction 6490.03, *Deployment Health* (Aug. 11, 2006) (certified current as of Sept. 30, 2011).

base's closure. According to DOD officials, environmental surveys are conducted, generally once a year, and these surveys assist in identifying both potential risks to servicemembers' health and air pollutants. However, DOD officials stated that there are no processes in place to specifically monitor burn pit emissions for the purposes of correlating potential exposures. They attribute this to a lack of singular exposure to the burn pit emissions, or emissions from any other individual item; instead, monitoring is done for the totality of air pollutants from all sources at the point of population exposure. An official from U.S. Africa Command, however, stated that efforts are underway in that command's area of responsibility to conduct an air quality study specifically because of the use of burn pits by local nationals off the installation where DOD personnel are housed. Given the potential use of burn pits near installations and their potential use in future contingency operations, establishing processes to monitor burn pit emissions for unacceptable exposures would better position DOD and combatant commanders to collect data that could help assess exposure to risks.

In the absence of the collection of data to examine the effects of burn pit exposure on servicemembers, the Department of Veterans Affairs in 2014 created the airborne hazards and open-air burn pit registry,²⁸ which allows eligible individuals to self-report exposures to airborne hazards (such as smoke from burn pits, oil-well fires, or pollution during deployment), as well as other exposures and health concerns.²⁹ The registry helps to monitor health conditions affecting veterans and servicemembers, and to collect data that will assist in improving programs to help those with deployment exposure concerns.

With respect to the information on the health effects from exposure to burn pit emissions, DOD officials stated that there are short-term effects from being exposed to toxins from the burning of waste, such as eye irritation and burning, coughing and throat irritation, breathing difficulties, and skin itching and rashes. However, the officials also stated that DOD

²⁸ This registry was created in response to the Dignified Burial and Other Veterans' Benefits Improvement Act of 2012, Pub. L. No. 112-260, § 201 (, 2013).

²⁹ Eligible individuals include servicemembers or veterans who served in Iraq or Afghanistan on or after September 11, 2001, the Southwest Asia theater of operations, on or after August 2, 1990 (e.g., the Persian Gulf War; and Djibouti on or after September 11, 2001.

does not have enough data to confirm whether direct exposure to burn pits causes long-term health issues. Although DOD and the Department of Veterans Affairs have commissioned studies to enhance their understanding of airborne hazards, including burn pit emissions, the current lack of data on emissions specific to burn pits limits DOD's ability to fully assess potential health impacts on servicemembers and other base personnel, such as contractors. For example, in a 2011 study that was contracted by the Department of Veterans Affairs, the Institute of Medicine stated that it was unable to determine whether long-term health effects are likely to result from burn pit exposure due to inadequate evidence of an association.³⁰ While the study did not determine a linkage to long-term health effects, because of the lack of data, it did not discredit the relationship either. Rather, it outlined a methodology of how to collect the necessary data to determine the effects of the exposure.

Specifically, the 2011 study outlined the feasibility and design issues for an epidemiologic study—that is, a study of the distribution and determinants of diseases and injuries in human populations—of veterans exposed to burn pit emissions. The elements of a well-designed epidemiologic study of the potential health effects of an environmental exposure include identification of a relevant study population of adequate size; comprehensive assessment of exposure; careful evaluation of health outcomes; adequate follow-up time; reasonable methods for controlling, confounding, and minimizing bias; and appropriate statistical analyses. Further, the 2011 study reported that there are a variety of methods for collecting exposure information, but the most desirable is to measure exposures quantitatively at the individual level. Individual exposure measurements can be obtained through personal monitoring data or biomonitoring.³¹ However, if individual monitoring data are not available, and they rarely are, individual exposure data may also be

³⁰ Institute of Medicine for the Department of Veterans Affairs. *Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan*. Washington, D.C.: The National Academies Press, 2011.

³¹ Biomonitoring assesses an individual's exposure to environmental agents by measuring the concentrations of the agents in biological samples, usually blood or urine but possibly adipose tissue, hair, or nails. The biomarker can be the external substance itself (for example, lead), or a metabolite of the external substance processed by the body (for example, cotinine, a metabolite of nicotine), and it indicates the absorbed dose or allows an estimate of target-tissue dose for the time of exposure.

estimated from modeling of exposures, self-reported surveys, interviews, job exposure matrixes, and environmental monitoring. Further, to determine the incidence of chronic disease, the study states that servicemembers must be tracked from their time of deployment, over many years. The 2011 study goes into further detail on how data can be collected, with alternatives, and processed without biases.

While the methodology of how to conduct an epidemiologic study is outlined, DOD has not taken steps to conduct this type of research study, specifically one that focuses on the direct, individual exposure to burn pit emissions and the possible long-term health effects of such exposure. Instead, some officials commented that there were no long-term health effects linked to the exposures of burn pits because the 2011 study did not acknowledge any. Conversely, Veterans Affairs officials stated that a study aimed at establishing health effect linkages could be enabled by the data in its airborne hazards and open-air burn pit registry, which collects self-reported information on servicemembers' deployment location and exposure.

Further, in response to a mandate contained in section 201 of Public Law 112-260, the National Academies of Sciences, Engineering, and Medicine will convene a committee to provide recommendations on collecting, maintaining, and monitoring information through the registry. The committee will assess the effectiveness of the Department of Veterans Affairs' information gathering efforts and provide recommendations for addressing the future medical needs of the affected groups. The study will be conducted in two phases. Phase 1 will be a review of the data collection methods and outcomes, as well as an analysis of the self-reported veteran experience data gathered in the registry. Phase 2 will focus on the assessment of the effectiveness of the actions taken by the Department of Veterans Affairs and DOD and will provide recommendations for improving the methods enacted. According to officials, the expected release date of the report is late fall of 2016. Considering the results of this review as well as the methodology of the 2011 Institute of Medicine study as part of an examination of the relationship between direct, individual exposure to burn pit emissions and long-term health effects could better position DOD to fully assess those health risks.

Conclusions

For over three decades, DOD has understood that disposing of waste in burn pits poses health hazards. In light of its experience in Iraq and Afghanistan, CENTCOM has taken steps to reduce burn pit use in its area of responsibility through the use of alternative methods of waste

disposal, such as incinerators. However, DOD likely cannot completely eliminate the need for burn pits in future contingency operations. Although CENTCOM has specific policies and procedures for burn pit operations in its area of responsibility, other geographic commands do not, potentially leaving them ill-prepared to plan for and to safely and effectively manage burn pits in the event of contingency operations in their respective geographic regions. Moreover, although DOD and the Department of Veterans Affairs have commissioned studies to enhance their understanding of airborne hazards during deployments, given that DOD may have to use burn pits in future contingency operations, as allowed under current policies, ensuring that research efforts specifically examine the relationship between direct, individual exposure to burn pit emissions and long-term health issues could help improve the understanding and potentially minimize risks related to such exposure.

Recommendations for Executive Action

To better position combatant commanders to implement the requirements of DOD Instruction 4715.19 if burn pits become necessary and to assist in planning for waste disposal in future military operations, we recommend that the Secretary of Defense direct the combatant commanders of U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command to establish implementation policies and procedures for waste management. Such policies and procedures should include, as applicable, specific organizations within each combatant command with responsibility for ensuring compliance with relevant policies and procedures, including burn pit notification, and, when appropriate, monitoring and reporting on the use of burn pits.

To better understand the long-term health effects of exposure to the disposal of covered waste in burn pits, we recommend that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to take the following two actions:

- Take steps to ensure CENTCOM and other geographic combatant commands, as appropriate, establish processes to consistently monitor burn pit emissions for unacceptable exposures.
- In coordination with the Secretary of Veterans Affairs, specifically examine the relationship between direct, individual, burn pit exposure and potential long-term health-related issues. As part of that examination, consider the results of the National Academies of Sciences, Engineering, and Medicine's report on the Department of Veteran Affairs registry and the methodology outlined in the 2011 Institute of Medicine study that suggests the need to evaluate the

health status of service members from their time of deployment over many years to determine their incidence of chronic disease, with particular attention to the collection of data at the individual level, including the means by which that data is obtained.

Agency Comments and Our Evaluation

We provided a draft of this report to DOD and the Department of Veterans Affairs for review and comment. In its written comments, DOD concurred with our first recommendation and partially concurred with our second and third recommendations. The Department of Veterans Affairs provided general comments on our draft report but did not comment specifically on the recommendations. DOD's and the Department of Veterans Affairs' comments are summarized below and reprinted in their entirety in appendixes I and II, respectively. Additionally, DOD and the Department of Veterans Affairs also provided technical comments, which we incorporated into the report, as appropriate.

DOD concurred with our first recommendation that the Secretary of Defense direct the combatant commanders of U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command to establish implementation policies and procedures for waste management, to include burn pit notification and, when appropriate, monitoring and reporting on the use of burn pits.

DOD partially concurred with our second and third recommendations in the draft report, that it take steps to ensure that CENTCOM and other geographic combatant commands, as appropriate, establish processes to consistently monitor burn pit emissions and that the department, in coordination with the Secretary of Veterans Affairs, sponsor research to examine the relationship between burn pit exposure and potential health-related issues. In its response, DOD stated that it will ensure that geographic combatant commands establish and employ processes to consistently monitor burn pit emissions for unacceptable exposures at the point of exposure and, if necessary, at individual sources. However, DOD also stated that our recommendation in the draft report to sponsor research did not acknowledge the volume of research conducted and planned by the department and the Secretary of Veterans Affairs, in collaboration with other research entities. Specifically, DOD stated in its letter that research studies have already been completed, are ongoing, or are planned to improve the understanding of burn pit and other ambient exposures to long-term health outcomes, and that the studies, where applicable, consider and incorporate the methodology outlined in the 2011 Institute of Medicine study. Additionally, DOD stated that it has implemented an Airborne Hazards Joint Action Plan process

collaboratively with the Department of Veterans Affairs as a primary means of identifying research needs within DOD and the Department of Veterans Affairs to address burn pit and other ambient air exposures during deployments.

In our report, we acknowledge that DOD and the Department of Veterans Affairs have commissioned studies to enhance their understanding of airborne hazards during deployment, including burn pit emissions, many of which are listed in the department's response to our recommendation in the draft report. We also agree that the ongoing and planned research studies listed in DOD's response will continue to contribute to the general knowledge of health effects of airborne hazards during deployment. However, during the course of our review, DOD and other officials told us that they have not specifically examined the relationship between direct, individual burn pit exposure and potential long-term health-related issues. Further the research studies presented in DOD's response to our draft recommendation do not directly make this linkage either. This current lack of data on direct, individual exposure to burn pit emissions limits DOD's ability to fully assess potential long-term health impacts on servicemembers. As we discussed in the report, the 2011 Institute of Medicine study outlines a methodology of how to collect the necessary data to determine the effects of exposure. Specifically, the 2011 study states that the most desirable method to measure exposures quantitatively is at the individual level. Individual exposure measurements can be obtained through personal monitoring data. The intent of the recommendation in the draft report was to address this linkage. Therefore, we have clarified our recommendation and our report and continue to believe that research that addresses individual exposure to burn pit emissions and the potential long-term health effects would help provide important information to fully understand and mitigate future health risks.

In its general comments, the Department of Veterans Affairs noted that it coordinates with DOD in collecting data on veterans and servicemembers potentially exposed to burn pit emissions and other airborne exposures, to address relevant research needs. Additionally, the Department of Veterans Affairs stated that eligible servicemembers are urged to participate in the Airborne Hazards and Open Burn Pit Registry, and as of August 14, 2016, 84,958 individuals have completed an online questionnaire to elicit responses to multiple categories of health, among other things.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense; the Secretary of Veterans Affairs; the Under Secretary of Defense for Acquisition, Technology and Logistics; the relevant combatant commanders, and the Chairman of the Joint Chiefs of Staff. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512- 5431 or russellc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix III.

A handwritten signature in black ink, reading "Cary Russell". The signature is fluid and cursive, with the first name "Cary" and last name "Russell" clearly distinguishable.

Cary Russell
Director, Defense Capabilities and Management

List of Committees

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Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Thad Cochran
Chairman
The Honorable Richard Durbin
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Mac Thornberry
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Rodney Frelinghuysen
Chairman
The Honorable Peter J. Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Comments from the Department of Defense



ENERGY,
INSTALLATIONS,
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

3400 DEFENSE PENTAGON
WASHINGTON, DC 20301-3400

AUG 29 2016

Mr. Cary Russell
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Russell:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-16-781, "WASTE MANAGEMENT: DOD Has Generally Addressed Legislative Requirements on the Use of Burn Pits but Needs to Fully Assess Health Effects," dated July 28, 2016 (GAO Code 100148).

The Department is providing the enclosed official written comments for inclusion in the report.

Sincerely,

A handwritten signature in blue ink, which appears to read "Peter Potochney", is placed above the printed name.

Peter Potochney
Principal Deputy Assistant Secretary of Defense
(Energy, Installations, and Environment)
Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations, and Environment)

Enclosure:
As stated

**GAO DRAFT REPORT DATED JULY 28, 2016
GAO-16-781 (GAO CODE 100148)**

**“WASTE MANAGEMENT: DOD HAS GENERALLY ADDRESSED LEGISLATIVE
REQUIREMENTS ON THE USE OF BURN PITS BUT NEEDS TO FULLY ASSESS
HEALTH EFFECTS”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION**

RECOMMENDATION: To better position combatant commanders to implement the requirements of DOD Instruction 4715.19 if burn pits become necessary and to assist in planning for waste disposal in future military operations, the GAO recommend that the Secretary of Defense direct the combatant commanders of U.S. Africa Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command to establish implementation policies and procedures for waste management. Such policies and procedures should include, as applicable, specific organizations within each combatant command with responsibility for ensuring compliance with relevant policies and procedures, including burn pit notification, and, when appropriate, monitoring and reporting on the use of burn pits.

DoD RESPONSE: Concur

RECOMMENDATION: To better understand the long-term health efforts of exposure to the disposal of covered waste in burn pits, the GAO recommend that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to take the following two actions:

- Take steps to ensure CENTCOM and other geographic combatant commands, as appropriate, establish processes to consistently monitor burn pit emissions for unacceptable exposures.
- Sponsor research, in coordination with the Secretary of Veterans Affairs, to examine the relationship between burn pit exposure and potential health-related issues. As part of that examination, consider the results of the National Academies of Sciences, Engineering, and Medicine’s report on the Department of Veteran Affairs registry and the methodology outlined in the 2011 Institute of Medicine study that suggests the need to evaluate the health status of service members from their time of deployment over many years to determine their incidence of chronic disease, and addresses the collection of the necessary data to determine the effects of such exposure.

DoD RESPONSE: Partially concur.

Regarding the first action, the DoD will ensure that geographic combatant commands establish and employ processes to consistently monitor burn pit emissions for unacceptable exposures at the point of exposure and if necessary at individual sources.

Regarding the second action, the recommendation does not acknowledge the considerable volume of research conducted and planned by the DoD and the Secretary of Veterans Affairs (VA), in collaboration with other research entities, to examine the relationship between burn pit exposure and potential health-related issues. Many DoD and VA research studies have already been completed, are ongoing, or are planned to improve the understanding of burn pit and other ambient exposures to long term health outcomes. Where applicable, these studies consider and incorporate the methodology outlined in the 2011 Institute of Medicine study. Listed below are some of the completed and planned studies relating to burn pit exposures and potential health outcomes conducted by the DoD and VA in collaboration with other research entities (list is not all-inclusive). Additionally, the DoD and VA collaboratively implemented the VA/DoD Airborne Hazards Joint Action Plan process, overseen by the VA/DoD Deployment Health Working Group, as a primary means of identifying research needs within the DoD and VA to address burn pit and other ambient air exposures during deployments.

1. Completed Research Studies¹

- a. May 2010: U.S. Army Public Health Command Screening Risk Assessments, Joint Base Balad, Iraq.
- b. May 2010: Epidemiological Studies of Health Outcomes among Troops Deployed to Burn Pit Sites. U.S. Armed Forces Health Surveillance Center, the Naval Health Research Center, and the U.S. Army Public Health Command.
- c. July 2011: A Retrospective Cohort Study of Military Deployment and Post-Deployment Medical Encounters for Respiratory Conditions. *Military Medicine*.
- d. June 2012: The Effects of Exposure to Documented Open-Air Burn Pits on Respiratory Health Among Deployers of the Millenium Cohort Study. *Journal of Occupational and Environmental Medicine*.
- e. June 2012: Prospective Assessment of Chronic Multisymptom Illness Reporting Possibly Associated With Open-Air Burn Pit Smoke Exposure in Iraq. *Journal of Occupational and Environmental Medicine*.
- f. June 2012: Birth Outcomes Among Military Personnel After Exposure to Documented Open-Air Burn Pits Before and During Pregnancy. *Journal of Occupational and Environmental Medicine*.
- g. June 2012: Newly Reported Lupus and Rheumatoid Arthritis in Relation to Deployment Within Proximity to a Documented Open-Air Burn Pit in Iraq. *Journal of Occupational and Environmental Medicine*.
- h. February 2013: Department of Veterans Affairs Notice: Initial Research on the Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan. *Federal Register*, Vol 78, No 23, Monday February 4, 2013.

- i. March 2014: Prevalence of Respiratory Disease Among Veterans of Operation Enduring Freedom and Operation Iraqi Freedom: Results from the National Health Study for a New Generation of U.S. Veterans. *Military Medicine*.
 - j. July 2014: Study of Active Duty Military for Pulmonary Disease Related to Environmental Deployment Exposures (STAMPEDE). *American Journal of Respiratory Critical Care*.
 - k. 2015: Airborne Hazards Related to Deployments. Borden Institute, Textbooks of Military Medicine. (Note: The book was developed from the DoD-VA sponsored Airborne Hazards Symposium held in August 2012.)
 - l. April 2016: Occupational Exposures Among Personnel Working Near Combined Burn Pit and Incinerator Operations at Bagram Airfield, Afghanistan. *Inhalation Toxicity*.
 - m. July 2016: Burn Pit Emissions Exposure and Respiratory and Cardiovascular Conditions Among Airborne Hazards and Open Burn Pit Registry Participants. *Journal of Occupational and Environmental Medicine*.
 - n. August 2016: Utility of the Department of Defense Serum Repository in Assessing Deployment Exposure Surveillance. Special Issue of the *Journal of Occupational and Environmental Medicine*. (Note: This Special Issue includes 14 research studies focused on the feasibility of using biomarkers to assess exposures from burn pits and ambient air and health outcomes.)
2. Ongoing and Planned Research Studies¹
- a. Continuation of Study of Active Duty Military for Pulmonary Disease Related to Environmental Deployment Exposures (STAMPEDE II/III): Long-term follow-up of Service Members with diagnosed chronic lung disease related to deployment exposures.
 - b. Epidemiologic Study of Health Outcomes Among Troops Deployed to Burn Pit Sites: Retrospective cohort study of health outcomes among Service Members located near burn pits.
 - c. Millennium Cohort Study: Long-term prospective cohort study of post-deployment airborne hazard health effects, including burn pits and ambient exposures.
 - d. National Health Study for a New Generation of U.S. Veterans: Prospective cohort study consisting of three follow-up surveys over ten years to investigate health outcomes and deployment exposures.
 - e. Respiratory Health and Deployment to Iraq and Afghanistan: Cross-sectional study of deployed and non-deployed veterans to assess association of deployment and airborne exposures with current respiratory health.

4

¹As noted in the memorandum, the DoD and VA collaboratively implemented the VA/DoD Airborne Hazards Joint Action Plan process, overseen by the VA/DoD Deployment Health Working Group, as a primary means of identifying research needs within the DoD and VA to address burn pit and other ambient air exposures during deployments.

Appendix II: Comments from the Department of Veterans Affairs



DEPARTMENT OF VETERANS AFFAIRS
Washington DC 20420

August 29, 2016

Mr. Cary Russell
Director
Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Russell:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, ***"WASTE MANAGEMENT: DOD Has Generally Addressed Legislative Requirements on the Use of Burn Pits but Needs to Fully Assess Health Effects"*** (GAO-16-781).

The enclosure provides our general and technical comments. VA appreciates the opportunity to comment on your draft report.

Sincerely,

A handwritten signature in dark ink, appearing to read "Gina S. Farrisee".

Gina S. Farrisee
Deputy Chief of Staff

Enclosure

Enclosure

Department of Veterans Affairs (VA) Comments to
Government Accountability Office (GAO) Draft Report
***“WASTE MANAGEMENT: DOD Has Generally Addressed Legislative
Requirements on the Use of Burn Pits but Needs to Fully Assess Health Effects”***
(GAO-16-781)

General Comments:

In keeping with the Department Veterans Affairs/Department of Defense (VA/DoD) Deployment Health Working Group, Airborne Hazards Joint Action Plan (in Support of the VA/DOD Joint Executive Council Strategic Plan A), VA coordinates with DoD in collecting data on Veterans and Servicemembers potentially exposed to burn pit emissions and other airborne exposures to address relevant research needs. Eligible Veterans and Servicemembers are urged to participate in the *Airborne Hazards and Open Burn Pit Registry*. As of August 14, 2016, 84,958 individuals have completed an online questionnaire to elicit responses to multiple categories of health, preference, and contact information.

Registrants are offered a medical evaluation at a VA (for Veterans) or DoD (for Servicemembers) medical facility, both to discuss health concerns with a knowledgeable provider and also to collect clinical data for action and analysis.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Cary Russell, (202) 512-5431 or russellc@gao.gov

Staff Acknowledgments

In addition to the contact named above, Guy LoFaro (Assistant Director), Lorraine Ettaro, J. Alfredo Gomez, Mike Hix, Shahrzad Nikoo, Leigh Ann Sheffield, Cheryl Weissman, Natasha Wilder, and Eugene Wisnoski made key contributions to this report.

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